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The superiority of Mr. Chapman's method was further evinced by opening the door of the furnace and allowing a quantity of cold atmospheric air to enter in the usual way; when this was done, the smoke rolled out of the chimney in black dense clouds, which effect ceased almost immediately on closing the door.

RICHARD MOORSOM, Jun.

No. V.

EAST INDIAN ANNATTO.

TOWARDS the conclusion of the session 1822-3 the Society received a communication from James M'Killop, Esq. King's Arms-yard, Coleman-street, consisting of a note from that gentleman, a letter from Cruttenden, M'Killop, and Co. of Calcutta, and a few cakes of East India annatto.

The Society had, during some preceding years, offered a premium to the person who should import from any part of British India a certain quantity of annatto, equal in value as a dyeing drug to that which is produced in several of the late Spanish American colonies, and which is brought into this country under the name of Spanish annatto.

It appears from the letter of Cruttenden, M'Killop, and Co. that Messrs. C. Stewart and Co. lac-dye manufacturers in the Bancoorah district, Bengal, had been preparing, with great care, a small quantity of annatto, for the purpose of being distributed among the silk dyers of London, in order to obtain their opinion as to its value. It was their desire also that samples should be sent to the Society for the encouragement of Arts, Manufactures, and Commerce, not in claim of the premium offered, (for the quantity imported was not large enough to entitle them to come as candidates), but that the Society might institute some experimental enquiries respecting the probable utility of the article.

The Society directed their acquiescence in the request of Messrs. Stewart and Co. to be signified to Mr. M'Killop, and that gentleman, in consequence, transmitted to the Society the whole of the annatto, about 6lbs., which still remained in his possession.

The Spanish annatto is a fecula of a dark red colour, obtained in various parts of South America from the seeds of a plant, the *bixa orellana* of Linnæus, called *urucu* by the natives, and *roucou* by the French planters of Cayenne and the West Indies.

The seeds being collected, are bruised, moistened with water, and fermented; the resulting paste is then washed with water, which suspends the colouring particles. This turbid liquor being heated, the fecula rises to the top in the state of a thick scum, which is removed, and packed in leaves for exportation, forming what is known in commerce by the name of flag annatto. The French dry the annatto before packing it up; but that which is imported from the Spanish settlemens to this country being packed in a moist state, soon passes into the putrefactive process, and when it arrives in Europe has become extremely offensive to the smell.

The East Indian annatto is said to be prepared from the pulp of the seed capsules of a plant, the *metella tinctoria,* which grows wild in the neighbourhood of Seevendroog and in other parts of India. The sample sent to the Society is in the form of small thin cakes, perfectly dry, inodorous, and of a deep but dull orange red colour.

The first experiment made under the inspection of the committee of Chemistry, was at the dye-house of Mr. Reynolds in Spitalfields. Three of the cakes being ground up with a solution of potash were mixed with a hot solution of soap; the mode of proceeding being the same as that practised by Mr. Reynolds in preparing a vat of Spanish annatto. Skeins of white silk being dipped in this bath took a full orange colour, in the opinion of Mr. Reynolds, as bright and perfect in every respect as that given by the best Spanish annatto.

The next experiment was made at the dye-house of Mr. Jourdaine in Grub-street. Spanish and East Indian annatto, having each undergone the same previous treatment, were digested in a solution of pearlash in equal proportions, and then diluted with equal quantities of scalding water. Skeins of white silk were then dipped in each: those in the Spanish annatto came out of a full bright aurora, or orange red colour; those in the East Indian came out of a gold yellow colour. The first bath was almost exhausted, the second seemed quite as rich in colour as before the silk was dipped in it; showing that, when subjected to Mr. Jourdaine's process, the colouring matter of the East Indian annatto is possessed of but a very feeble attraction for silk. The skeins which had acquired the golden yellow colour became of a red (somewhat foxy) orange, by being passed through water acidulated with sulphuric acid; but there is an objection to the use of this latter process, as silk so treated is very liable to *scroop*, that is, to be harsh to the feel.

The small quantity of East Indian annatto that remained was then put into the hands of Mr. H. Hennell, a member of the Society, by whom the following facts were ascertained.

The Spanish annatto, as imported, contains sixty-one per cent. of water: the East Indian contains none. When the two have been brought to an equal state of dryness, alcohol takes up from the East Indian variety sixty-three per cent. of colouring matter, and from the Spanish only fifty-two parts.

Portions of each variety being dissolved in ammonia, in potash with or without heat, and in a mixture of potash and ammonia, communicated to skeins of silk various tints of colour from pale gold to full orange red, the superiority being sometimes in favour of one and sometimes of the other variety.